

## Correspondence

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# How useful are the cold pressor test and sustained isometric handgrip exercise with radionuclide ventriculography in the evaluation of patients with coronary artery disease?

Sir,

I read with interest the opinions of Northcote and Cooke (1987;57:319-28) on the use of gated blood pool scanning with either isometric handgrip or cold pressor testing for the detection of coronary artery disease.

Giles *et al* used a nuclear probe capable of measuring beat to beat ejection fraction to study these responses and found that troughs in left ventricular ejection fraction occurred at 2.5 min (range 0.5 to 3.0 min) for handgrip and 1.7 min (range 0.5 to 3.0 min) for cold pressor in patients with confirmed coronary disease.<sup>1</sup> Normal controls also had troughs within 3.0 min. There was considerable overlap between patients and controls in terms of both the fall in ejection fraction and the absolute level attained.

Gated blood pool scanning with five minute acquisition seems to be a poor technique for analysing a transient phenomenon with peak effect occurring in less than three minutes. The best that can be measured is an average ejection fraction response. Others have confirmed the time course for cold pressor testing with first pass blood pool scanning<sup>2</sup>; and both isometric handgrip and cold pressor were tested by Jones *et al*,<sup>3</sup> who used a technique similar to that of Giles *et al*.

Use of cold pressor testing or isometric handgrip to detect coronary artery disease is an attractive idea. Unfortunately, with current radionuclide blood pool imaging methods it does not work.

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## References

- 1 Giles G, Marx P, Commerford P, *et al*. Rapid sequential changes in left ventricular function during cold pressor and isometric handgrip: relationship to blood pressure and mechanistic implications [Abstract]. *Am J Cardiol* 1982;49:1002.
- 2 Dymond DS, Caplin JL, Flatman W, Burnett P, Banim S, Spurrell R. Temporal evolution of changes in left ventricular function induced by cold pressor stimulation. An assessment with radionuclide angiography and gold 195 m. *Br Heart J* 1984;51:557-64.
- 3 Jones RI, Lahiri A, Cashman PMM, Dore C, Raftery EB. Left ventricular function during isometric handgrip and cold stress in normal subjects. *Br Heart J* 1986;55:246-52.

This letter was shown to Dr Northcote, who replies as follows:

Sir,

Review of our paper evaluating both cold pressor testing and isometric handgrip exercise in conjunction with radionuclide ventriculography shows that we are not at variance with the views of Dr Marx. We clearly conclude from our results that both interventions produce data of poor specificity and sensitivity for the detection of coronary artery disease.

It was not, however, our exclusive remit to examine the usefulness of these tests in the detection of coronary artery disease. We also undertook to establish their viability when used in serial experiments, for example in long term drug studies or in a coronary care setting where repeat scans may be required. Under these circumstances, cold pressor testing and to a lesser extent isometric handgrip did prove to be useful with an acceptable coefficient of variation.

We are of course aware of previous work in this field quoted by Marx and are also aware of the use of the nuclear probe with these interventions, which with its beat to beat variation in ejection fraction has its own intrinsic problems.

It may be a compromise for serial studies to use cold pressor testing or isometric handgrip exercise in conjunction with gamma cameras with a high sensitivity collimator and image for two to three minutes rather than five. Dynamic exercise remains the ideal intervention for this technique, however,

when one can be satisfied that movement artefact is not important. Where this is not possible, however, either the cold pressor test or handgrip test may be useful for the serial evaluation of left ventricular performance but not for the detection of coronary artery disease.

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